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Theme Area: Environmental Resources

Program Area: Pest Management

Project No.: ER00.09

Project Title: Development of Biological Control Methods for Saltcedar and Knapweeds

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**Abstract:** This new research start will focus on two invasive riparian and terrestrial weeds of great importance to Reclamation: saltcedar and spotted knapweeds. The Bureau of Reclamation has thousands of miles of water distribution canals, rights-of-way, wetlands, wildlife resources, recreational areas, and reservoirs at significant risk of damage by the invasive weed species, saltcedar and knapweeds. Saltcedar and knapweeds have Bureau-wide distributions. The Colorado and Rio Grande rivers are currently severely impacted by saltcedar. The riparian area of the Lower Colorado River alone has over 45,000 acres of saltcedar in the area from Parker Dam to the Mexican border. Water flow almost completely disappears in stretches of the Rio Grande below El Paso. The weed is expanding into northern regions of the Pacific Northwest and Great Plains. Knapweeds also have wide regional distribution. These highly invasive plants utilize Reclamation rights of way as invasion routes to new territories. Both of these pests produce large volumes of vegetation, which obstruct water flow (saltcedar), prevent access for maintenance and recreation, cause structural damage, and otherwise negatively affect system operation, water quality, and wildlife habitat. Millions of acre-feet of water are lost annually as a result of such infestations. Often the aquatic nature and the intended use of the facility (irrigation, M&I, habitat, etc.) restrict available pest management options. Traditional pest management methods frequently lack the level of development necessary for immediate implementation in Reclamation settings. This coupled with the extreme aggressiveness and tenacity of these invasive weeds explains the reason they constitute major pest problems associated with Reclamation facilities.

Recent events and advancements have made the development of significant new tools for the management of these two weeds highly achievable:

- a) Limited field release in cages of biological control insects (*Diorhabda elongata*) for saltcedar have just recently received approval by the Department of Agriculture and the Fish and Wildlife Service. As a result of preliminary attempts at rearing, Reclamation currently has the

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only significant source of these insects in the United States. Techniques need to be developed for the mass rearing and field testing of this highly promising insect for saltcedar control.

b) Methods which are currently being developed jointly by Reclamation and Cornell University scientists are making it possible to drastically shorten the rearing times of biological control insects with long life cycles. In recent studies to develop methods for the biological control of purple loosestrife, techniques were developed to artificially feed loosestrife root-boring weevils, *Hylobius transversovittatus*. Insects which once required as much as 2 years to complete a life cycle were produced in as little as 8 weeks by these techniques. This provides pest managers the capability of greatly shortening the time required to produce the needed quantities of insects to get effective control in the field. These techniques have a strong probability of success when applied to the similar root-feeding weevil for spotted knapweed, *Cyphocleonus achates* (knapweed root weevil). This weevil is believed to have the greatest potential for control of the highly invasive, spotted knapweed. Until now, efforts to control the weed with this insect were severely limited because of the tedious process of insect production.

The information gained from this research will be used in regional integrated pest management (IPM) programs. Technical assistance will be provided to Reclamation facilities through development of special studies and demonstration projects to promote IPM concepts and solve specific pest problems on Reclamation facilities.

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